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PATENT & TRADEMARK OFFICE

FIG. 1

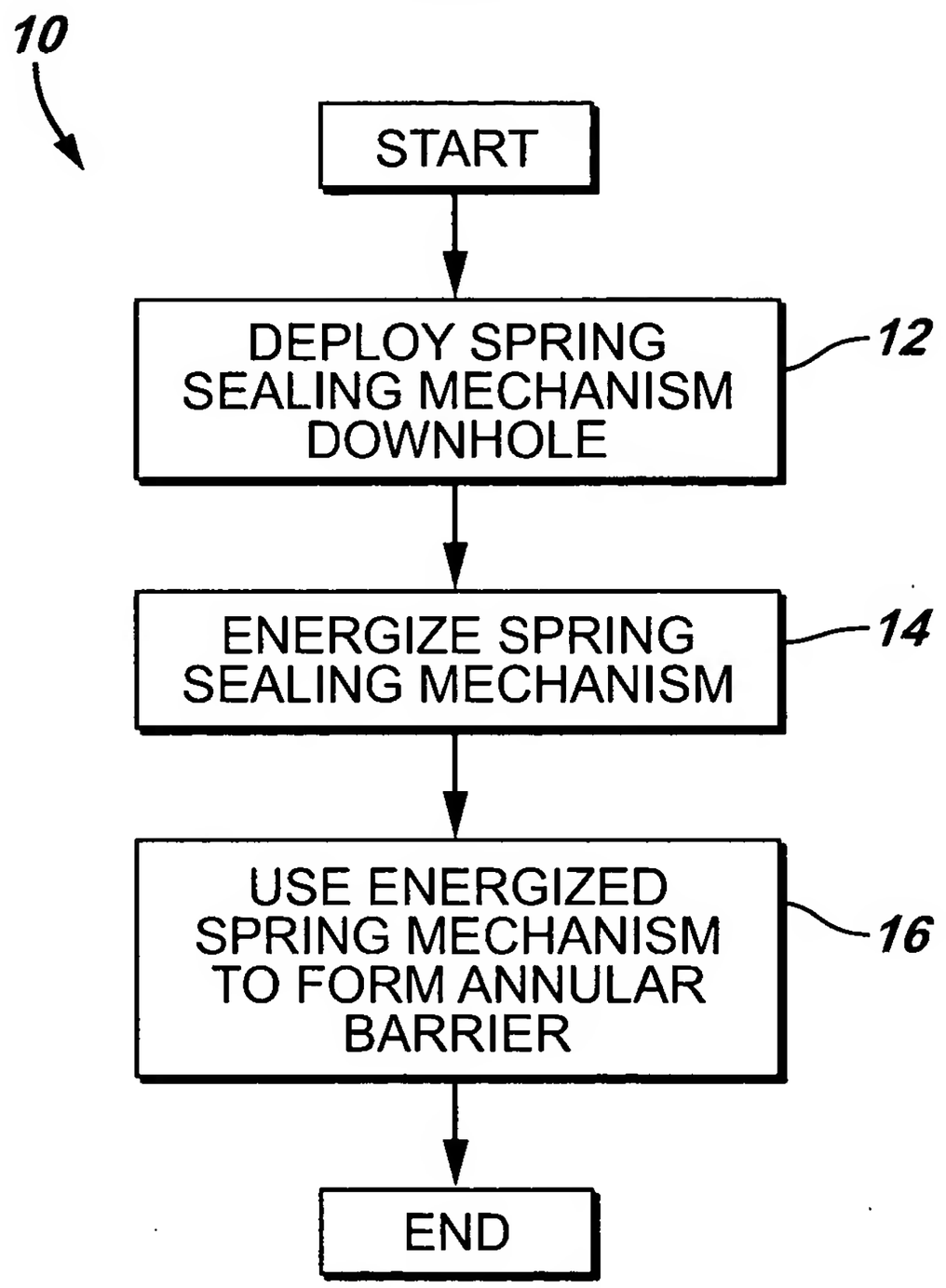


FIG. 2

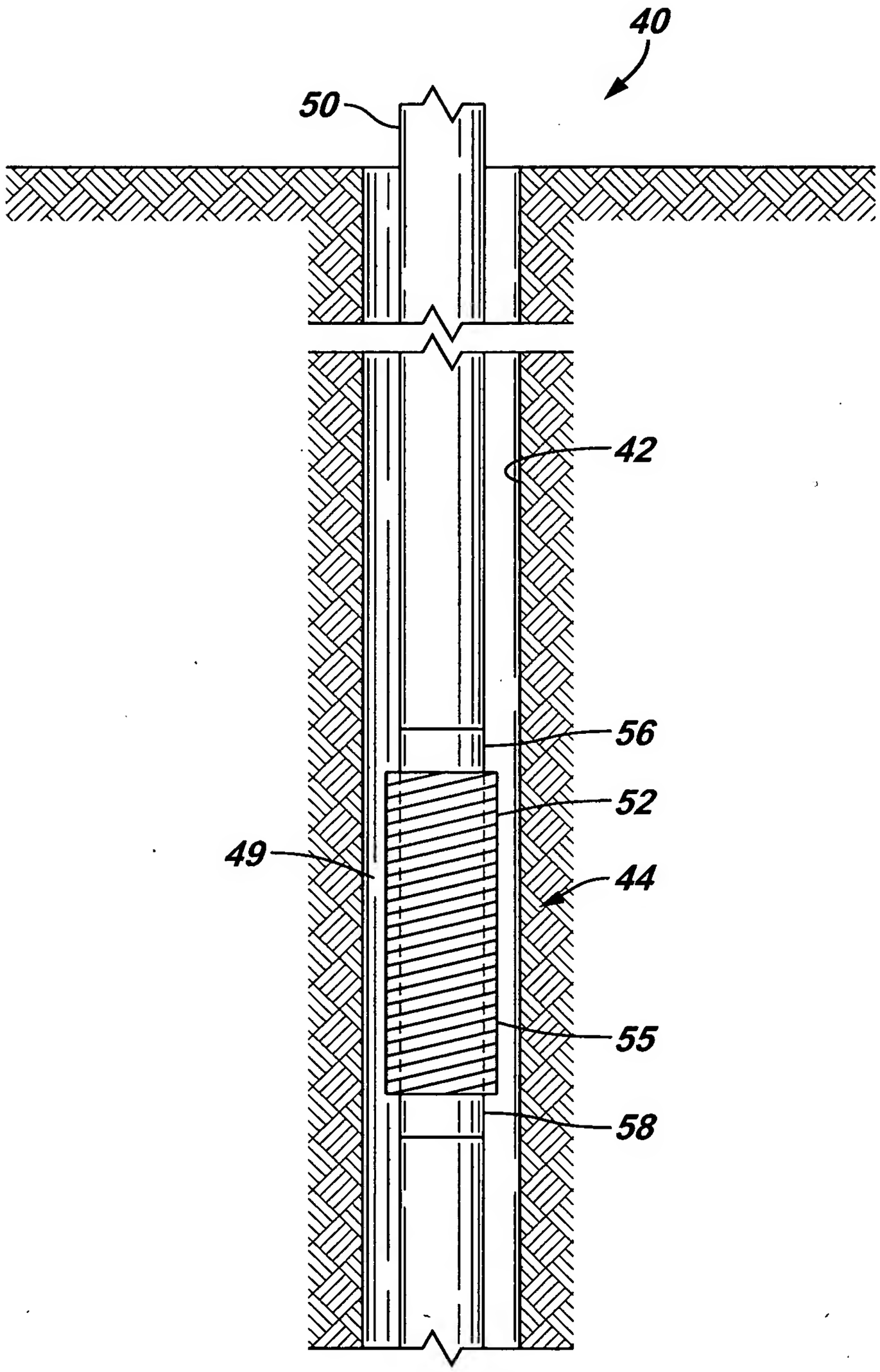


FIG. 3

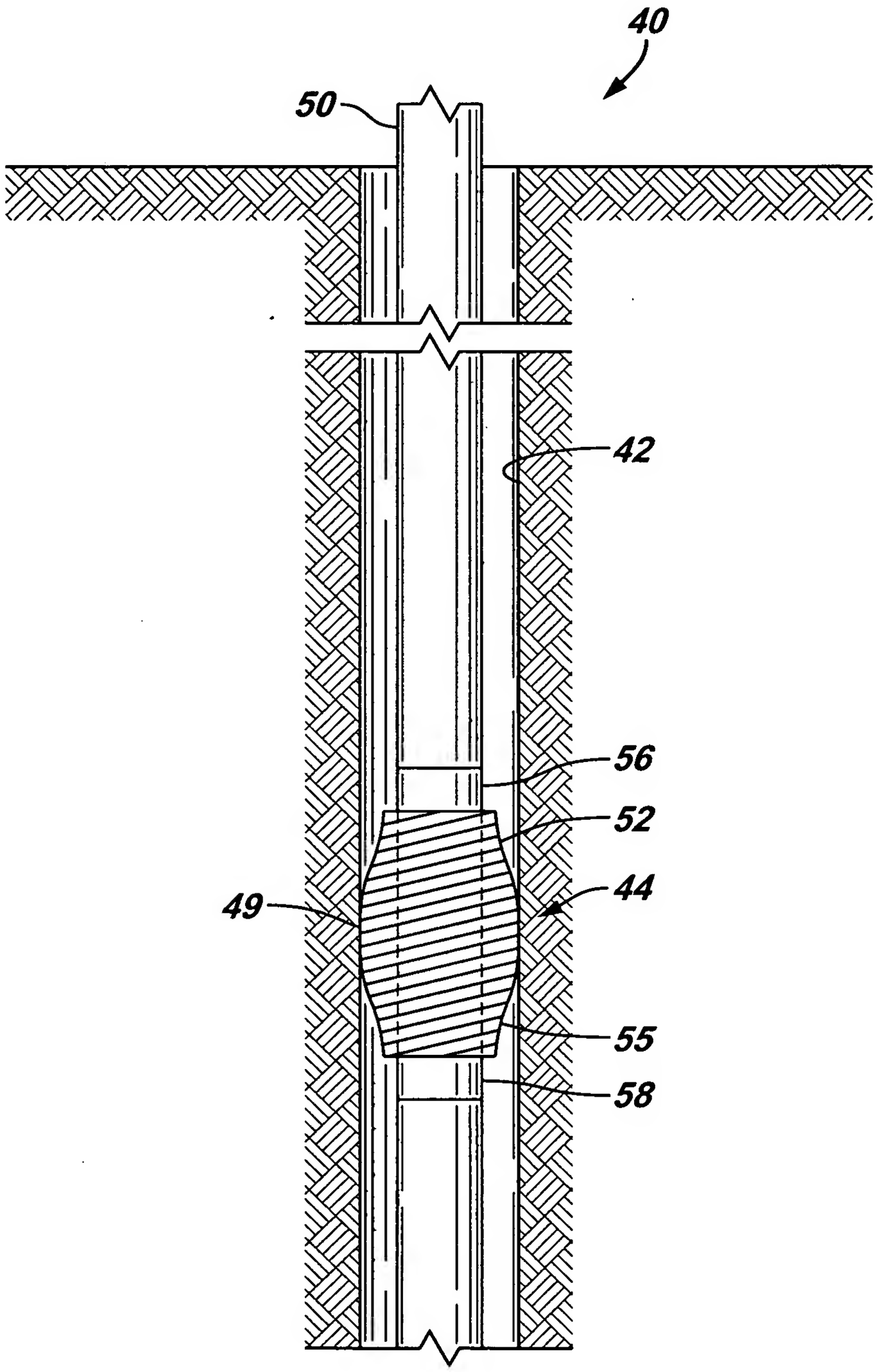


FIG. 4

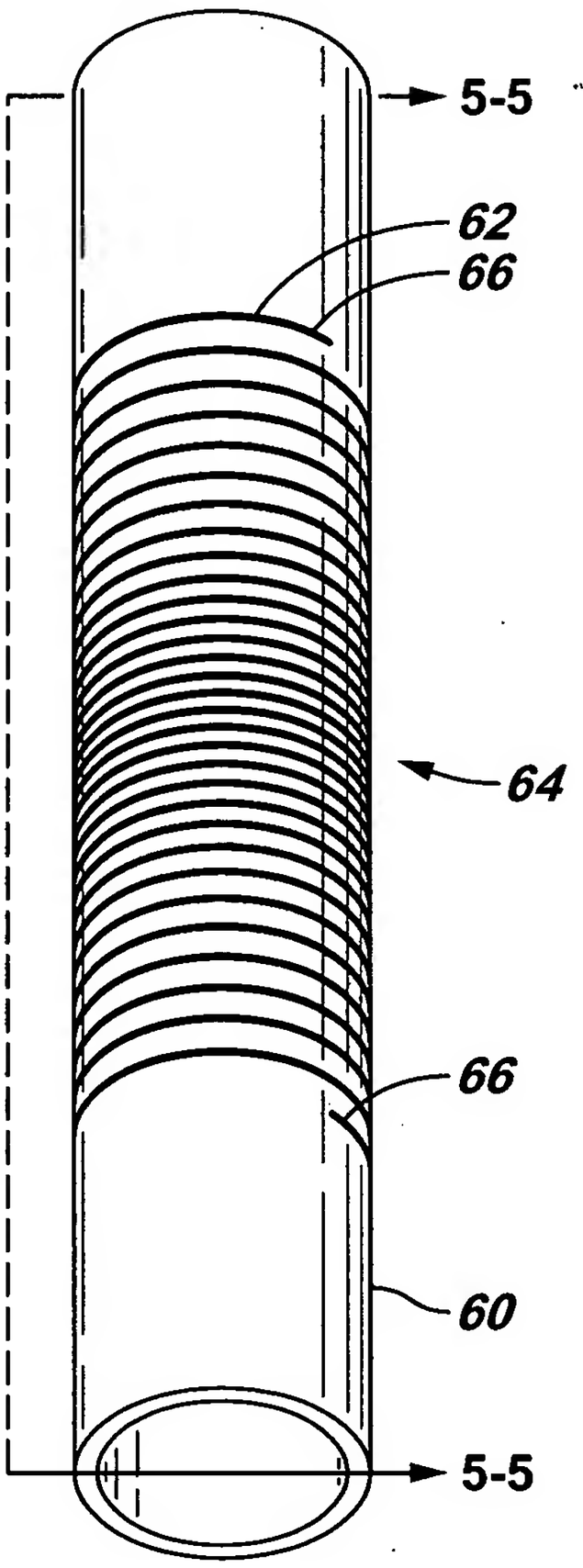


FIG. 5

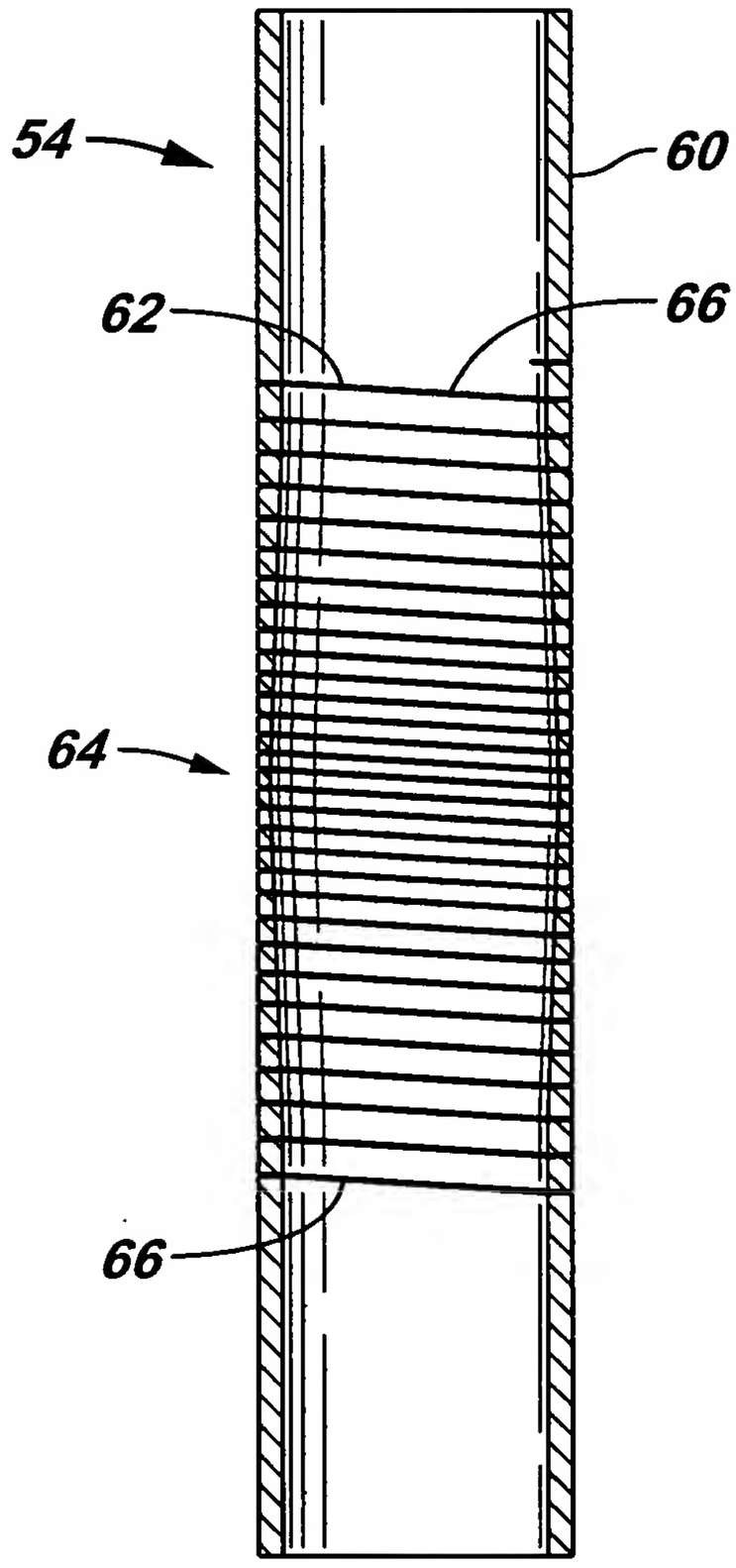


FIG. 6

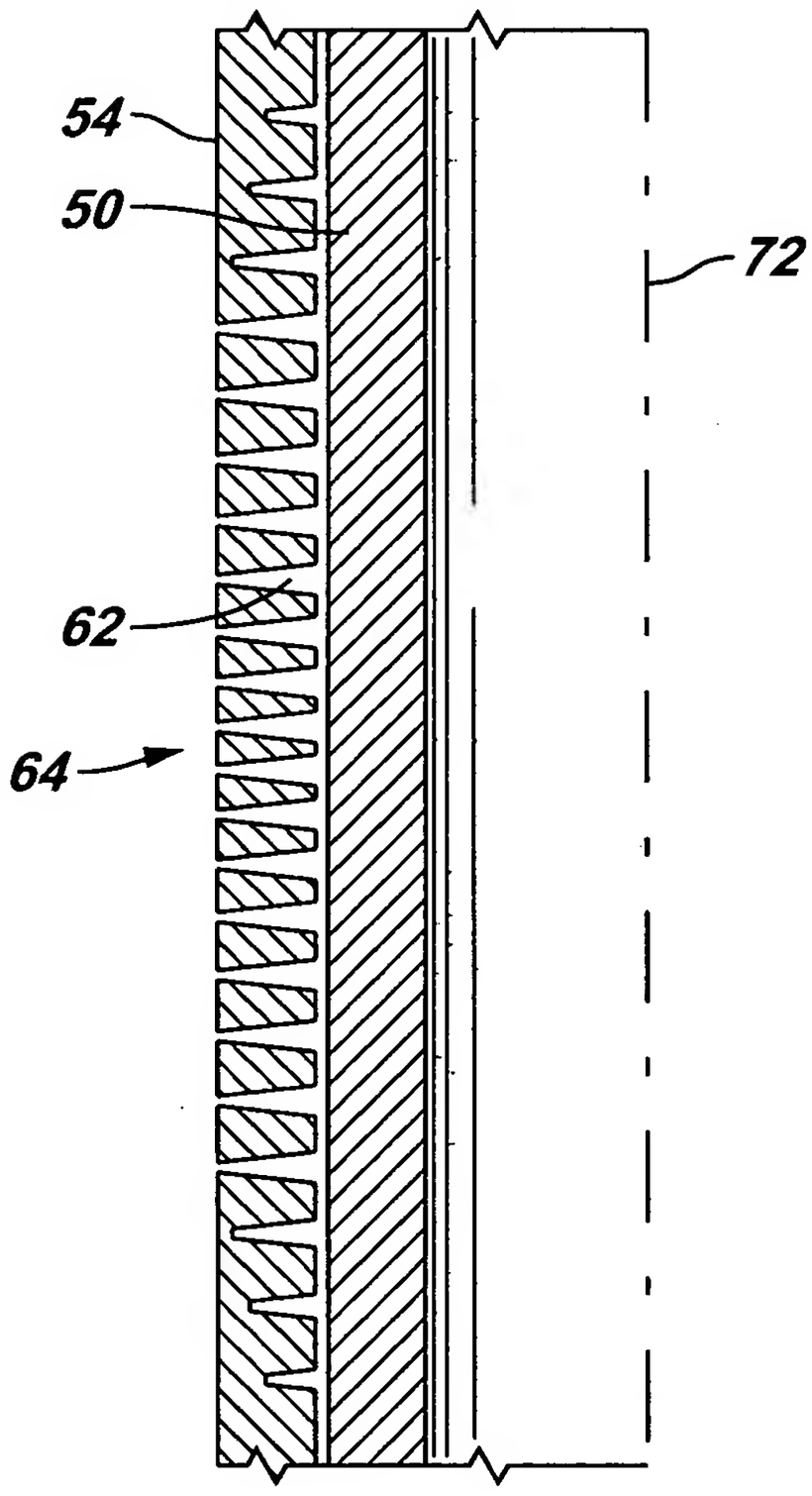


FIG. 7

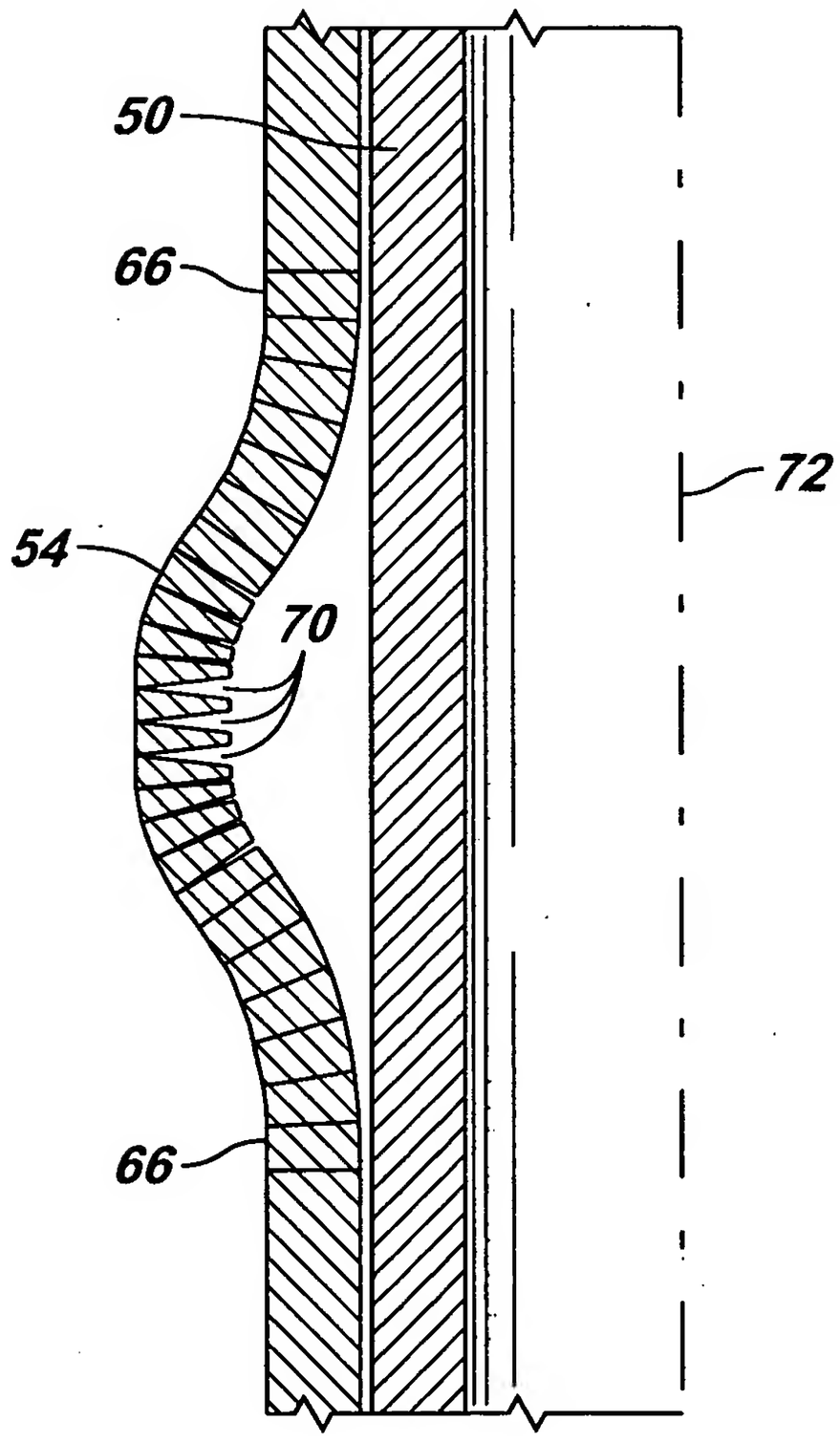


FIG. 8

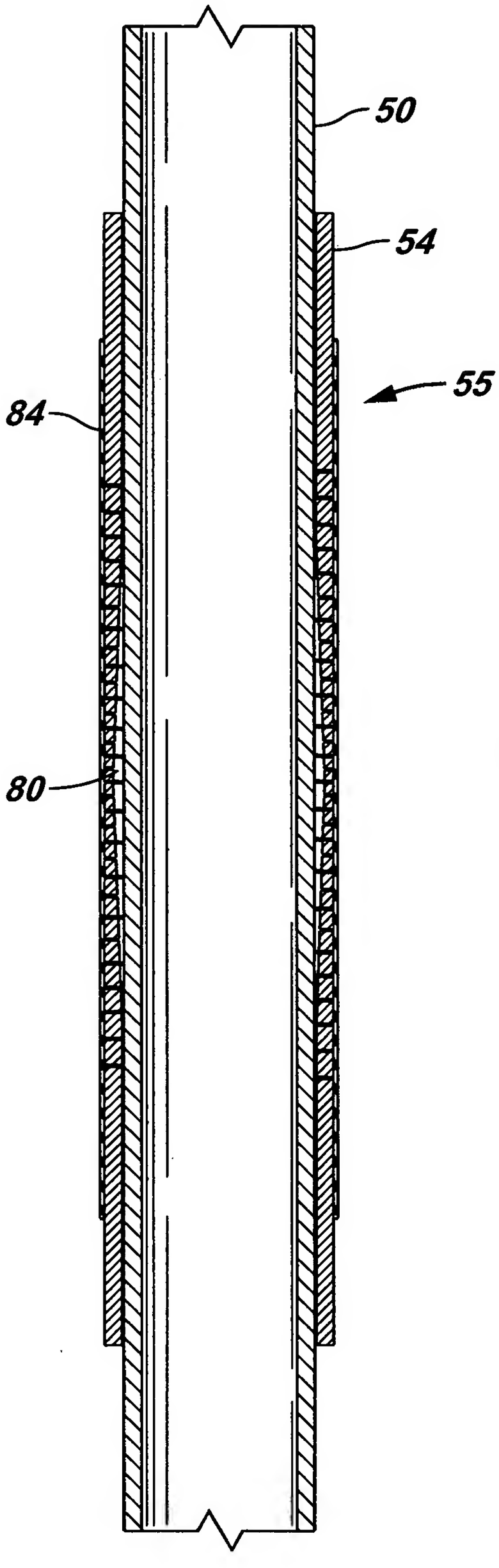


FIG. 9

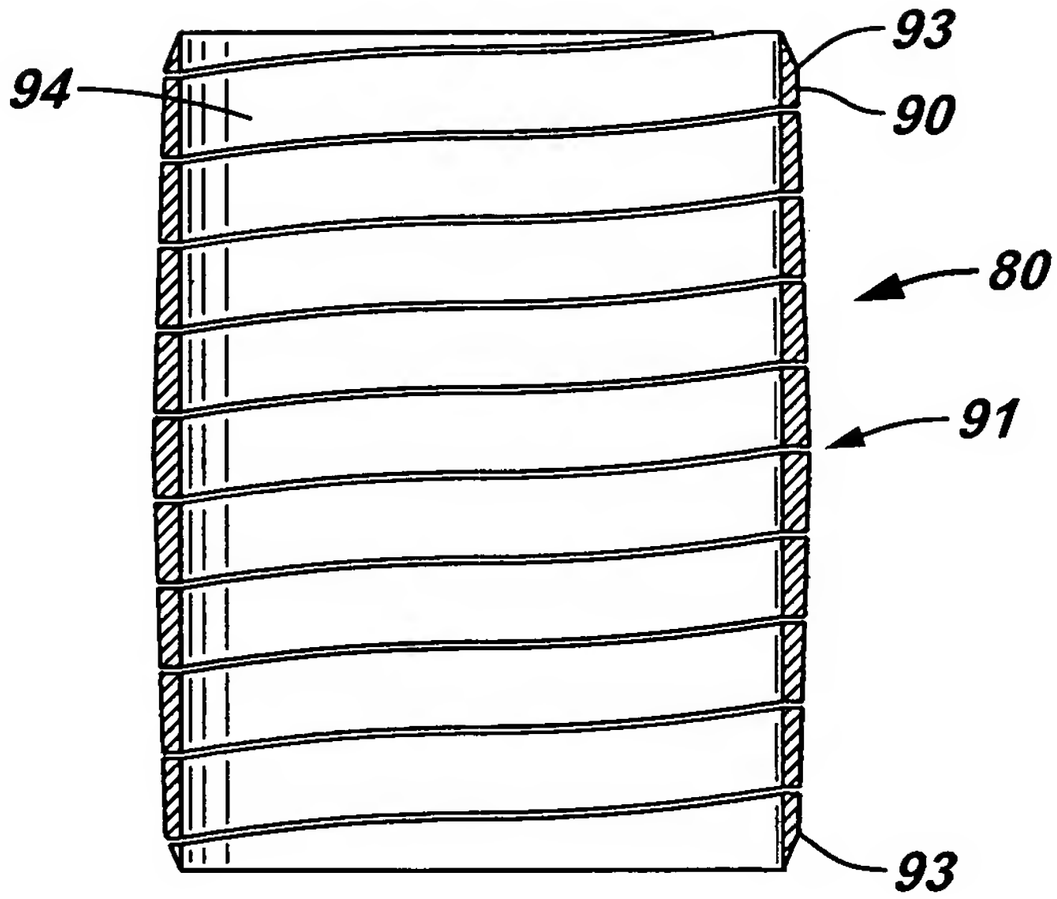


FIG. 10

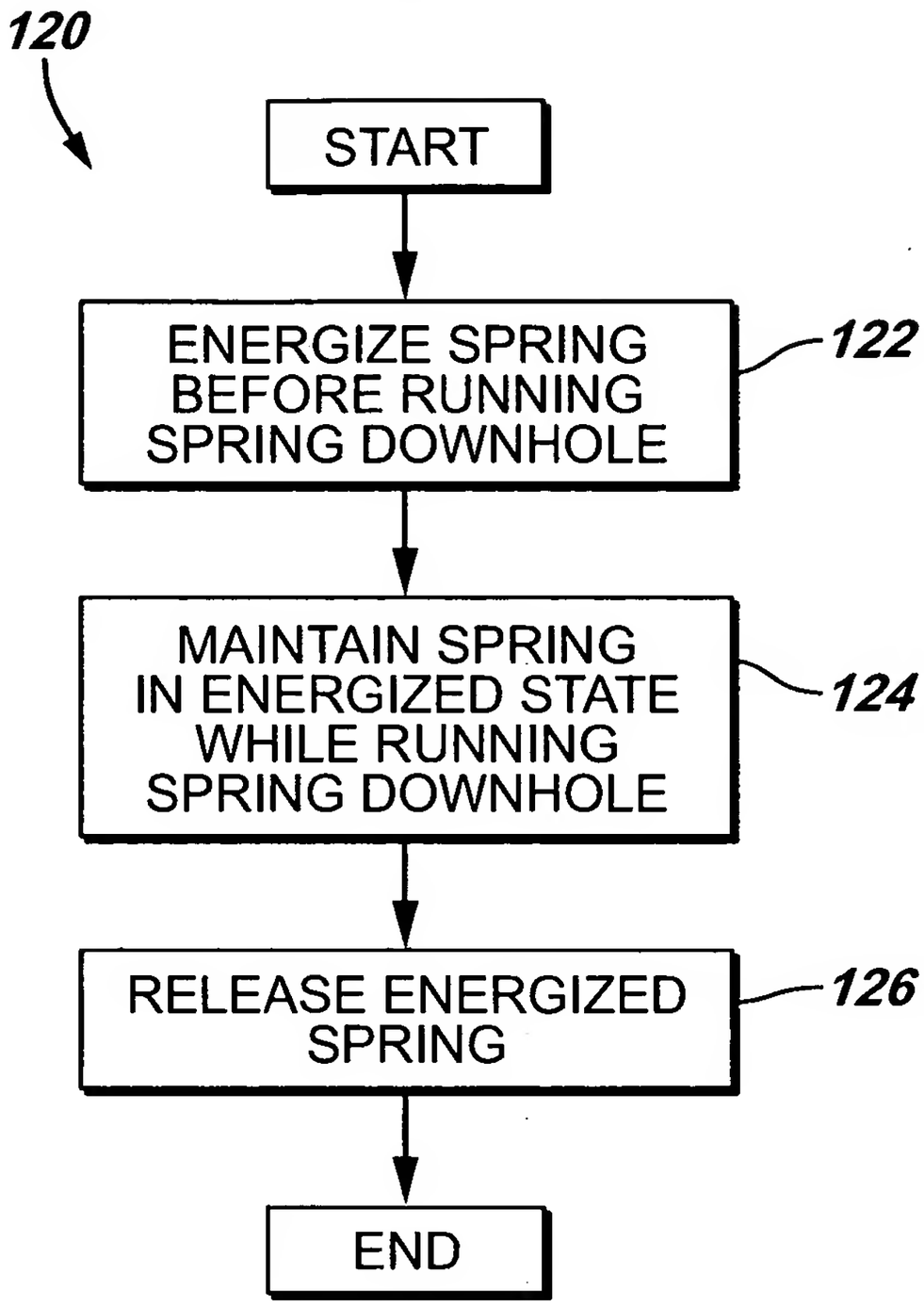

120
START
ENERGIZE SPRING BEFORE RUNNING SPRING DOWNHOLE
122
MAINTAIN SPRING IN ENERGIZED STATE WHILE RUNNING SPRING DOWNHOLE
124
RELEASE ENERGIZED SPRING
126
END

FIG. 11

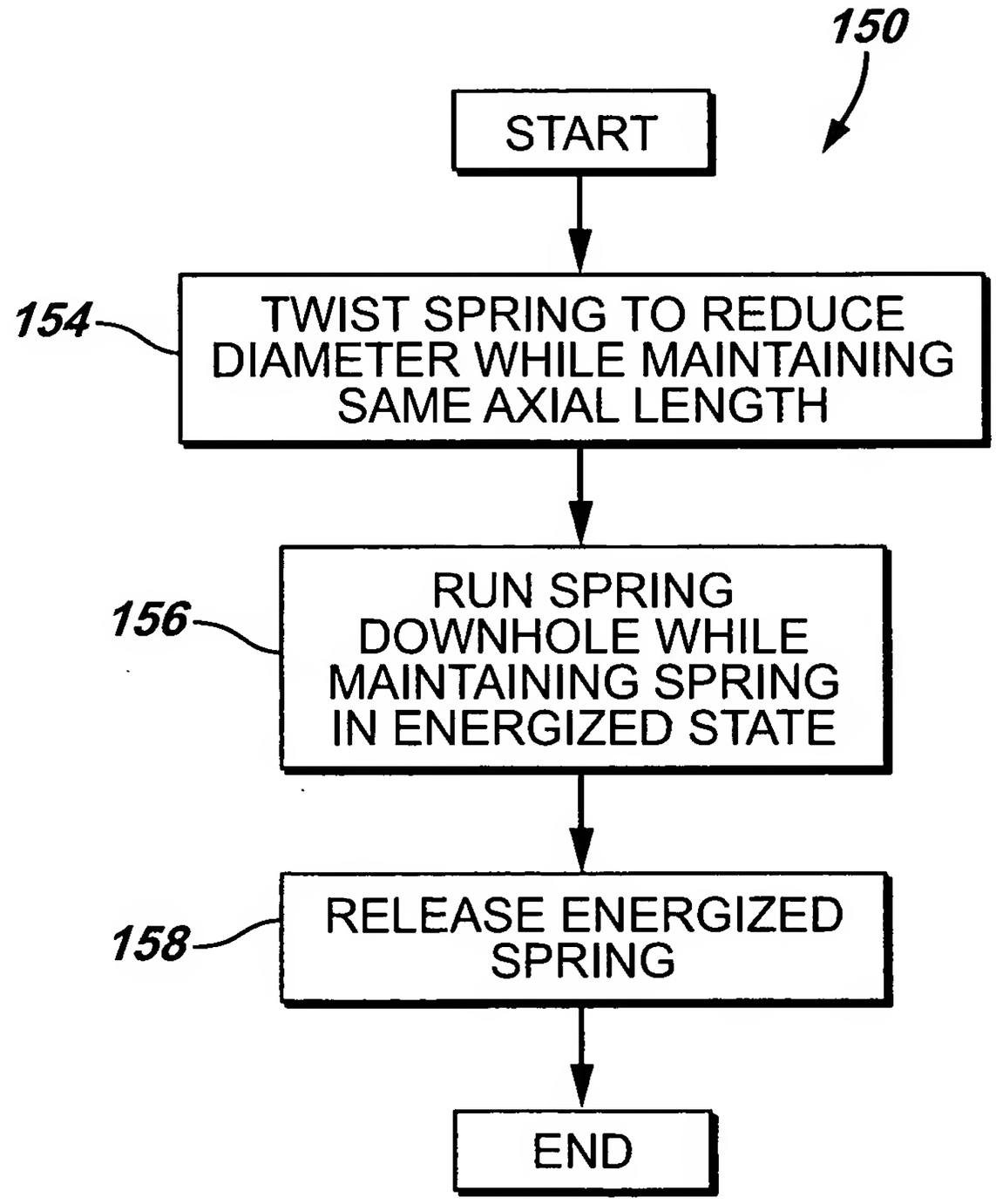

150
START
154
TWIST SPRING TO REDUCE DIAMETER WHILE MAINTAINING SAME AXIAL LENGTH
156
RUN SPRING DOWNHOLE WHILE MAINTAINING SPRING IN ENERGIZED STATE
158
RELEASE ENERGIZED SPRING
END

FIG. 12

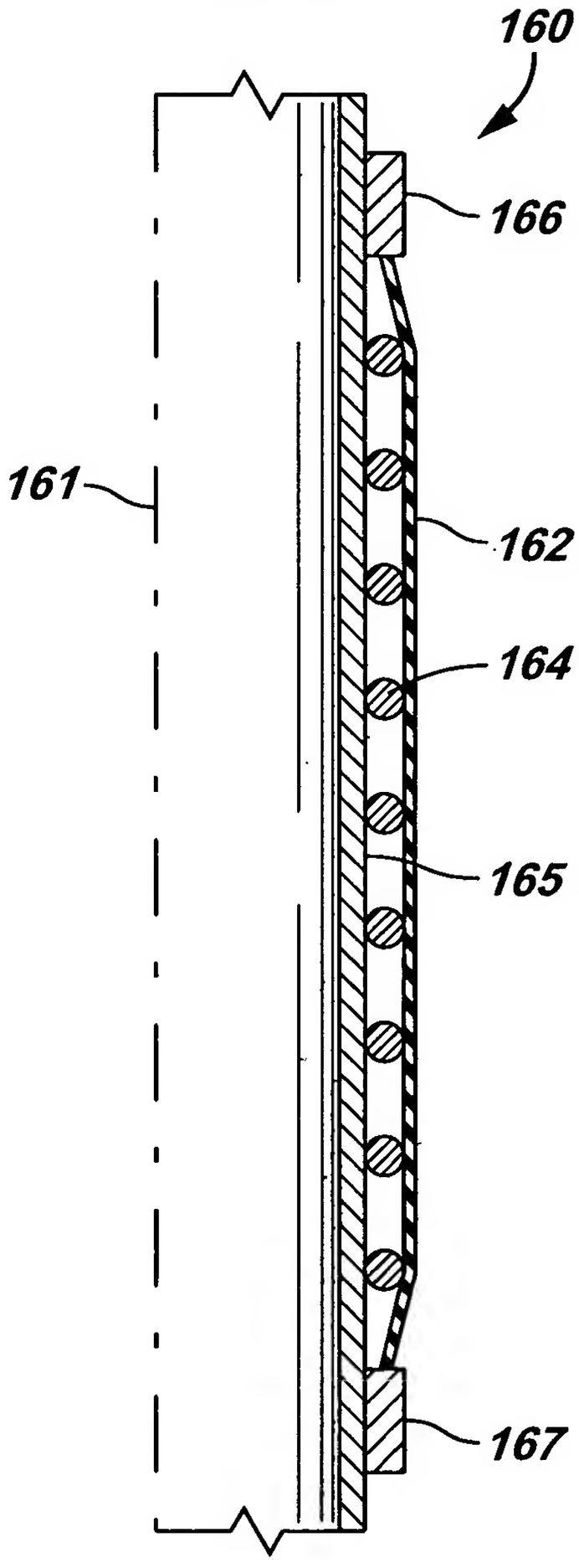


FIG. 13

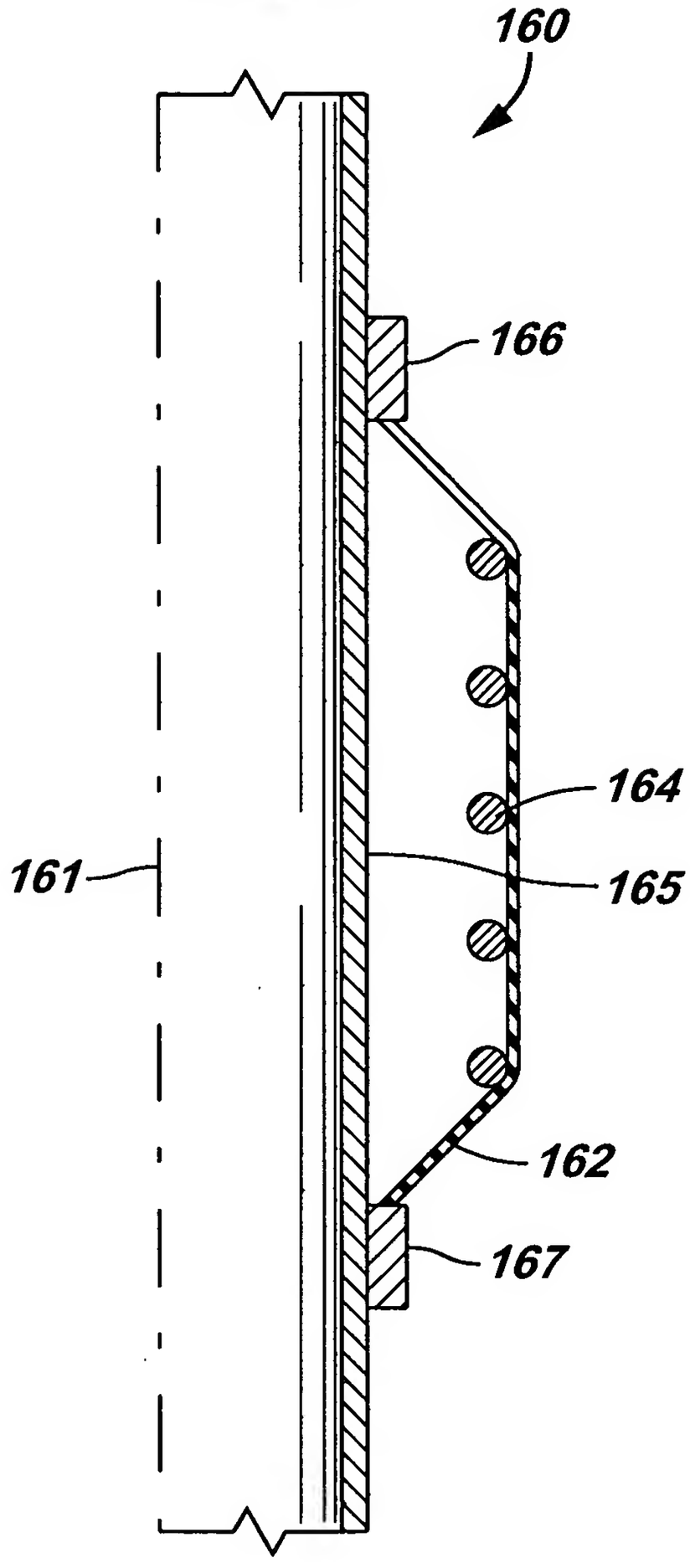
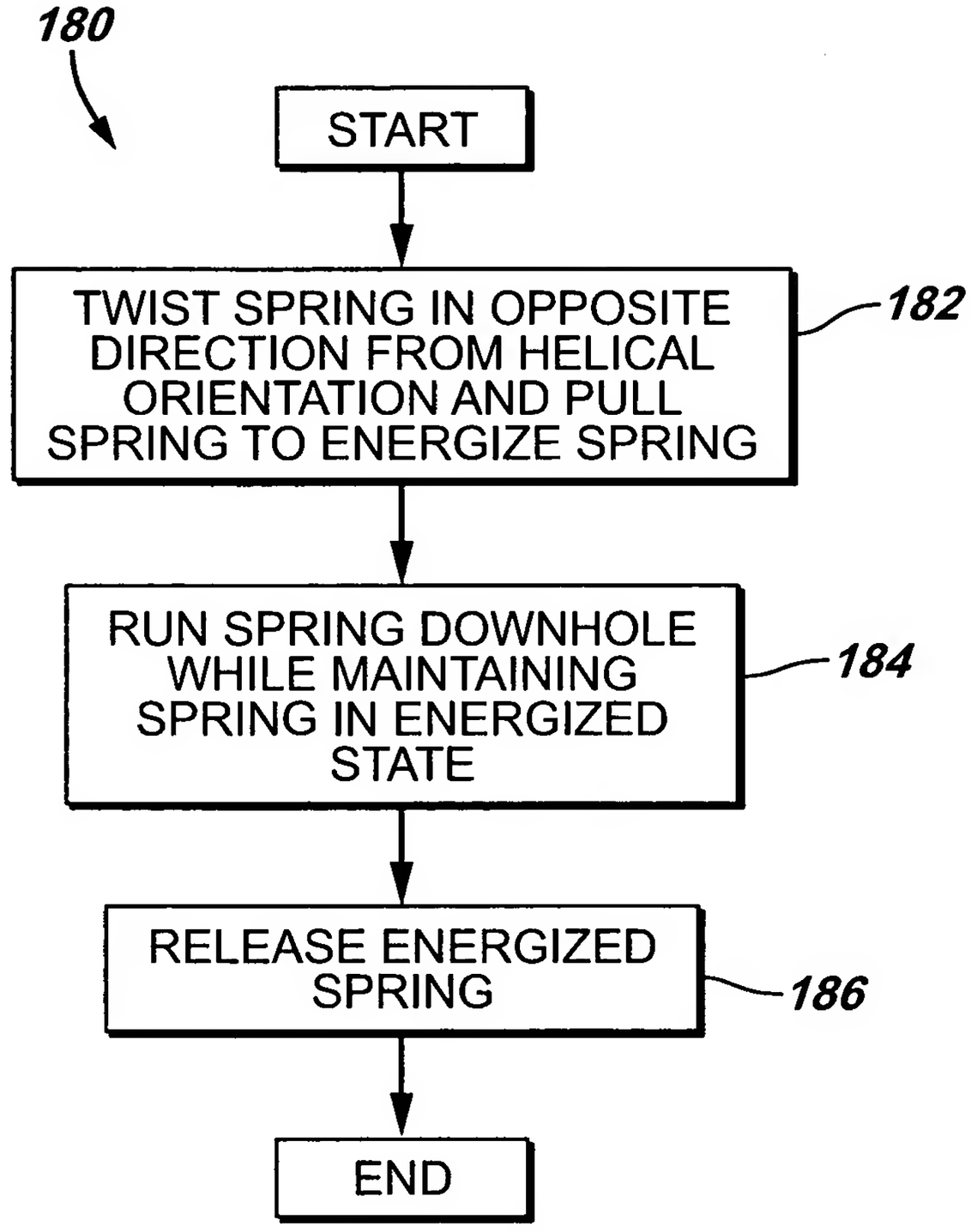


FIG. 14


180
START
TWIST SPRING IN OPPOSITE DIRECTION FROM HELICAL ORIENTATION AND PULL SPRING TO ENERGIZE SPRING
182
RUN SPRING DOWNHOLE WHILE MAINTAINING SPRING IN ENERGIZED STATE
184
RELEASE ENERGIZED SPRING
186
END